WHAT IS CLAIMED IS:

1. A system for use in optical measurement and/or inspection of sub-surface features in layered media, the system comprising:

an optical-to-electrical (OE) circuit configured to convert an optical signal into a first electrical signal, wherein the optical signal includes a plurality of wavelengths;

a demodulating circuit, wherein the demodulating circuit is coupled to receive the first electrical signal from the OE circuit and a demodulating signal, and wherein the demodulating circuit is further configured to provide as an output a second electrical signal, wherein the demodulating signal and the second electrical signal each correspond to one of the plurality of wavelengths.

2. The system as recited in claim 1, wherein the system further includes an output optics unit coupled to provide the optical signal to the OE circuit, wherein the output optics unit is coupled to receive a beam of light.

3. The system as recited in claim 2, wherein the beam of light is a reflected beam of light.

4. The system as recited in claim 2, wherein the beam of light is a diffracted beam of light.

5. The system as recited in claim 2, wherein the output optics unit is coupled to provide the optical signal to a plurality of OE circuits, wherein each of the OE circuits is coupled to one of a plurality of demodulating circuits, and wherein the plurality of OE circuits and the plurality of demodulating circuits form a demultiplexer.

6. The system as recited in claim 5, wherein the system further includes an optical multiplexer, wherein the optical multiplexer is coupled to receive a plurality of light beams, wherein each of the plurality of light beams has a different wavelength with respect to other ones of the plurality of light beams,

7. The system as recited in claim 6, wherein the optical multiplexer is coupled to a plurality of light sources, wherein each of the plurality of light sources provides one of the plurality of light beams.

8. The system as recited in claim 7, wherein each of the plurality of light sources is coupled to a modulator, wherein the modulator is configured to provide a modulating signal.

9. The system as recited in claim 7, wherein each of the plurality of light sources is modulated by a directly modulated diode.

10. The system as recited in claim 6, wherein the optical multiplexer is positioned to project an incident light beam onto a surface, wherein the incident light beam includes wavelengths corresponding to each of the plurality of light beams.

11. The system as recited in claim 6, wherein the optical multiplexer performs frequency division multiplexing and the demultiplexer performs frequency division demultiplexing.

12. The system as recited in claim 6, wherein the optical multiplexer performs time division multiplexing and the demultiplexer performs time division demultiplexing.

13. The system as recited in claim 6, wherein the optical multiplexer performs code division multiplexing and the demultiplexer performs code division demultiplexing.

14. The system as recited in claim 1, wherein the system is implemented in a lithography system.

15. A method for use in optical measurement and/or inspection of sub-surface features in layered media, the method comprising:

receiving an optical signal, wherein the optical signal includes a plurality of wavelengths;

converting the optical signal into a first electrical signal,

applying a demodulating signal to the first electrical signal; and

producing a second electrical signal responsive to said applying, wherein the second electrical signal corresponds to one of the wavelengths.

16. The method as recited in claim 15, wherein the optical signal is a reflected beam of light received by an output optics unit coupled to provide the optical signal to an optical-to-electrical (OE) circuit configured to perform said converting.

17. The method as recited in claim 15, wherein the optical signal is a diffracted beam of light received by an output optics unit coupled to provide the optical signal to an optical-to-electrical (OE) circuit configured to perform said converting.

18. The method as recited in claim 15, further comprising providing the optical signal to a plurality of OE circuits, wherein each of the OE circuits is coupled to one of a plurality of demodulating circuits, and wherein the plurality of OE circuits and the plurality of demodulating circuit form a demultiplexer.

19. The method as recited in claim 18 further comprising providing a plurality of light beams to an optical multiplexer, wherein each of the plurality of light beams has a different wavelength with respect to other ones of the plurality of light beams.

20. The method as recited in claim 19, wherein each of the plurality of light beams is provided by one of a plurality of light sources.

21. The method as recited in claim 20 further comprising modulating each of the plurality of light beams with a modulating signal, wherein each of the plurality of light sources is coupled to a modulator configured to provide a modulating signal.

22. The method as recited in claim 20 further comprising modulating each of the plurality of light beams with a directly modulated diode.

23. The method as recited in claim 20, wherein the optical multiplexer is positioned to provide an incident light beam onto a surface, wherein the incident light beam includes wavelengths corresponding to each of the plurality of light beams.

24. The method as recited in claim 20 further comprising the optical multiplexer performing frequency division multiplexing and the demultiplexer performing frequency division demultiplexing.

25. The method as recited in claim 20 further comprising the optical multiplexer performing time division multiplexing and the demultiplexer performing time division demultiplexing.

26. The method as recited in claim 20 further comprising the optical multiplexer performing code division multiplexing and the demultiplexer performing code division demultiplexing.

27. A method for measuring power for a plurality of input signals of an apparatus having outputs whose signals are linearly independent sums of the input signals, the method comprising:

performing a calibration procedure, wherein said performing yields a matrix having a plurality of calibration factor values;

measuring a signal value for each of a plurality of input signals, wherein said measuring yields a plurality of measured signal values;

forming a system of equations based on the matrix and the plurality of measured signal values; and

solving the system of equations, wherein said solving yields a plurality of signal power values, wherein each of the plurality of power values corresponds to a power value for one of the plurality of input signals, and wherein power contributions from other signals are substantially removed from each of the plurality of signal power values during said solving by the plurality of calibration factor values.

28. The method as recited in claim 27, wherein said performing the calibration procedure includes:

receiving the plurality of signals;

setting the power of all but one of the plurality of input signals to zero, wherein the one of the plurality of N input signals corresponds to a column in the matrix;

measuring output signal quantities for the one of the plurality of signals, wherein said signal quantities represent one or more of the plurality of calibration factor values;

repeating said setting and said measuring for each of the plurality of input signals, forming a matrix from the plurality of calibration factor values.

29. The method as recited in claim 27, wherein the system of equations is formed based on the equation:

$$M_n = \sum_{i=1}^{N} P_i T_{ni},$$

wherein M is a matrix whose elements are signal quantities, n is a value between 1 and N, P is a matrix whose elements are a power values corresponding to the plurality of input signals, and T is a matrix whose elements are calibration factor values.

30. The method as recited in claim 29, wherein each of the signal quantities is composed predominantly of a single input power value corresponding to a calibration factor that is relatively large with respect to other ones of the plurality of calibration factor values.

31. The method as recited in claim 30, wherein said solving includes solving the equation

$$P_n \cong \frac{1}{T_{nn}}\left[M_n - \sum_{i \neq n} M_i \frac{T_{ni}}{T_{ii}}\right],$$

wherein each value of P_n is a power value for one of the plurality of input signals.

32. An isolation unit for isolating measured signals, the isolation unit comprising:

a processor; and

a carrier medium coupled to the processor, wherein the carrier medium is configured to store a plurality of instructions, that, when executed by the processor:

perform a calibration procedure, wherein performing the calibration procedure yields a matrix having a plurality of calibration factor values;

measure signal values for each of a plurality of input signals, wherein measuring yields a plurality of measured signal values;

form a system of equations based on the matrix and the plurality of measured signal values; and

solve the system of equations, wherein solving the system of equations yields a plurality of signal power values, wherein each of the plurality of power values corresponds to a power value for one of the plurality of input signals, and wherein power contributions from other signals are substantially removed from of each of the plurality of signal power values during said solving by the plurality of calibration factor values.

33. The isolation unit as recited in claim 32, wherein the isolation unit includes an analog-to-digital converter (ADC), wherein the ADC is coupled to receive the plurality of input signals in an analog format and to convert each of the plurality of input signals into a digital format.

34. The isolation unit as recited in claim 32, wherein the calibration procedure includes:

receiving the plurality of signals;

setting the power of all but one of the plurality of input signals to zero, wherein the one of the plurality of N input signals corresponds to a column in the matrix;

measuring a signal quantities for the one of the plurality of signals, wherein said signal quantities represents one or more of the plurality of calibration factor values;

repeating said setting and said measuring for each of the plurality of input signals, forming a matrix from the plurality of calibration factor values.